

Adding and Subtracting Rational Expressions

■ **Concept:** Adding and subtracting rational expressions

Remember: If denominators are the same, add or subtract the numerators. If the denominators are different, follow these steps:

Step 1 Find the least common denominator of all the expressions.

Step 2 Rewrite each rational expression using the least common denominator.

Step 3 Add or subtract the numerators.

Step 4 Simplify.

Example: Add: $\frac{4x}{2x+4} + \frac{3}{6x^2}$

Step 1 $2x+4$ and $6x^2$.

$$2(x+2) \quad 2 \cdot 3 \cdot x^2$$

$$2 \cdot 3 \cdot x^2(x+2)$$

$$6x^2(x+2)$$

Factor each denominator.

Find the least common denominator.

Simplify.

Step 2 $\frac{4x \cdot 3x^2}{2(x+2) \cdot 3x^2} + \frac{3(x+2)}{6x^2(x+2)}$

Rewrite each rational expression using the least common denominator.

$$\frac{12x^3}{6x^2(x+2)} + \frac{3x+6}{6x^2(x+2)}$$

Simplify.

Step 3 $\frac{12x^3 + 3x + 6}{6x^2(x+2)}$

Add the numerators.

Step 4 $\frac{3(4x^3 + x + 2)}{6x^2(x+2)}$

Simplify. Factor the numerator.

$$\frac{3(4x^3 + x + 2)}{6x^2(x+2)}$$

Divide out common factors.

$$\frac{4x^3 + x + 2}{2x^2(x+2)}$$

Simplify.

Add or subtract.

1. $\frac{x^2}{5} + \frac{x^2}{5}$ _____

2. $\frac{x^2 - 2}{12} + \frac{x}{6}$ _____

3. $\frac{12}{xy^3} - \frac{9}{xy^3}$ _____

4. $\frac{6x^2}{3x-2} + \frac{5x-6}{3x-2}$ _____

5. $\frac{2}{x+3} + \frac{3}{x+2}$ _____

6. $\frac{-2}{n+4} - \frac{n^2}{n^2-16}$ _____